IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	Customer Number: 46320
	:	
Robert ENENKEL, et al.	:	Confirmation Number: 5643
	:	
Application No.: 10/008,473	:	Group Art Unit: 2123
	:	
Filed: November 9, 2001	:	Examiner: T. Stevens
	:	

For: METHOD AND APPARATUS FOR EVALUATING POLYNOMIALS AND
         RATIONAL FUNCTIONS

REPLY BRIEF

Mail Stop Appeal Brief - Patents
Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

        This Reply Brief is submitted under 37 C.F.R. § 41.41 in response to the EXAMINER'S

ANSWER dated August 23, 2007.

        The Examiner's response to Appellants' arguments submitted in the Appeal Brief of

February 16, 2007, raises additional issues and underscores the factual and legal shortcomings in

the Examiner's rejection. In response, Appellants rely upon the arguments presented in the

Appeal Brief of February 16, 2007, and the arguments set forth below.

1　　　　　　　　　　　　　　　　　　　101 Rejection

2

3　　　　　　On pages 4-11 of the Appeal Brief, Appellants presented extensive arguments with

4　regard to the Examiner's rejection of the claims under 35 U.S.C. § 101. At the outset, Appellants

5　note that the Examiner "Ground of Rejection" found on pages 3-4 of the Examiner's Answer is

6　essentially identical to the Examiner statement of the rejection in the Fourth Office Action. The

7　Examiner's response to Appellants' arguments is found on pages 13-15 of the Examiner's

8　Answer. Although the section purports to be a "response" to Appellants' arguments, these

9　assertions do not directly address Appellants' arguments. Instead, these assertions raise new

10　arguments not previously presented by the Examiner.

11

12　　　　　　In the first full paragraph on page 13 of the Examiner's Answer, the Examiner stated the

13　following:

14　　　　　　　　Appellants' summary of the prior art on pages 4 and 5 of the Brief is agreed with.
15　　　　　　　　However, appellants' statement regarding the greater precision than the inherent precision of the
16　　　　　　　　floating-point number system of the computer system is not considered to be found within the
17　　　　　　　　claimed invention. Furthermore, the issue to be considered for the rejection based upon 35 U. S. C.
18　　　　　　　　101 is not whether the prior art discloses or makes obvious the claimed invention but whether the
19　　　　　　　　subject matter claimed is eligible for patenting.
20
21　Appellants are unaware of any requirement that the claims, themselves, are required to recite the

22　useful, concrete, and tangible result. The function of the claims is not to enable the invention or

23　describe the end result of the invention. Instead, claims are only required to "particularly [point]

24　out and distinctly [claim] the subject matter which the applicant regards as his invention."[1] As

25　noted in the arguments presented on pages 8 and 9 of the Appeal Brief, a statement of the utility

26　can be found in the specification. The Examiner's comment about obviousness neither addresses

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[1] Second paragraph of 35 U.S.C. § 112.

1 an argument previously presented by Appellants nor appears particularly germane to the issues at

2 hand.

3

4   In the second full paragraph on page 13 of the Examiner's Answer, the Examiner

5 reproduced a passage from <u>Gottschalk v. Benson</u> and asserted the following:

6   Appellants have admitted that the invention is the solving of a polynomial, albeit at a
7   greater degree of accuracy than has been previously known. Assuming for argument's sake that
8   appellants' invention solves a polynomial to a greater precision than has been known before, the
9   invention as claimed is still not considered to be directed to patent eligible subject mailer. Simply
10   put, solving a polynomial is still just solving a polynomial no matter what the degree of accuracy.
11
12 At the outset, Appellants note that the first sentence of the above-reproduced passage has

13 mischaracterized Appellants' invention. Appellants' claimed invention is not <u>solely</u> "directed to

14 solving of a polynomial." Moreover, the Examiner's assertion as to "a greater degree of accuracy

15 than has been previously known" also mischaracterizes the invention. As previously noted by

16 Appellants, any specified computer has a known degree of accuracy. The claimed invention is

17 directed to a computer and a computer implemented-method that are capable of providing a

18 computer, with an inherent degree of accuracy in approximating a polynomial, with a greater

19 degree of accuracy. Applicants also note that the Examiner mischaracterized the invention by

20 asserting that "solving a polynomial is still just solving a polynomial no matter what the degree

21 of accuracy." In many instances, polynomials are <u>not</u> <u>solved</u>, they are approximated.

22

23   After citing the passage in <u>Gottschalk v. Benson</u>, the Examiner's further asserted the

24 following in the first full paragraph on page 14 of the Examiner's Answer:

25   The process of solving a polynomial is an abstract intellectual concept, no matter what the degree
26   of precision. It is one of the basic tools of scientific and technological work and as such should not
27   be the subject of a patent.
28

3

1   What the Examiner implies through the Examiner's citation of <u>Gottschalk v. Benson</u> in

2   combination with the above paragraph grossly mischaracterizes the facts. Appellants are <u>not</u>

3   claiming a scientific truth or the mathematical expression thereof. In fact, Appellants are <u>not</u>

4   claiming how to <u>solve</u> the scientific truth of the mathematical expression (e.g., the polynomial).

5   Moreover, Appellants are not even claiming all techniques used to approximate a polynomial.

6   Instead, Appellant are, in part, claiming one particular technique (out of many in the prior art) of

7   approximately a polynomial that has a particular benefit for improving the inherent degree of

8   accuracy of a particular computer.

9

10   In the second full paragraph on page 14 of the Examiner's Answer, the Examiner asserted

11   the following:

> 12   The examiner's citation of In re Schrader in the office action is withdrawn. However, it
> 13   should be noted that it is not the Freeman-Walter-Abele test that is at issue here. <u>It is whether the</u>
> 14   <u>appellants are claiming an algorithm or not</u>. Here there is no need for a two-part test to determine
> 15   that appellants' are claiming an algorithm since by its very nature, the process of computing a
> 16   polynomial is an algorithm. (emphasis added)

17

18   Whether or not Appellants are claiming an algorithm is not solely dispositive in a rejection under

19   35 U.S.C. § 101. The question is whether the claim, as a whole, is directed to statutory subject

20   matter. In this regard, reference is made to M.P.E.P. § 2106(II)(A), which states:

> 21   Finally, when evaluating the scope of a claim, <u>every</u> limitation in the claim must be
> 22   considered. Office personnel may not dissect a claimed invention into discrete elements and then
> 23   evaluate the elements <u>in isolation</u>. Instead, the claim as a whole must be considered. See, e.g.,
> 24   *Diamond v. Diehr*, 450 U.S. at 188-89, 209 USPQ at 9 ("In determining the eligibility of
> 25   respondents' claimed process for patent protection under 101, their claims must be considered as a
> 26   whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the
> 27   presence of the old elements in the analysis. This is particularly true in a process claim because a
> 28   new combination of steps in a process may be patentable even though all the constituents of the
> 29   combination were well known and in common use before the combination was made.").
> 30   (emphasis in original)

31

1   As readily apparent from the Examiner's own comments, the Examiner is not focusing on the

2   claimed invention, <u>as a whole</u>, as required. Instead, the Examiner is focusing only on particular

3   elements of the claimed invention.

4

5   In the following paragraph on page 14 of the Examiner's Answer, the Examiner cites

6   <u>Parker v. Flook</u>. In this regard, Appellants respectfully submit that the Examiner has again cited

7   case law that is not germane to the present issues. Appellants are not claiming a "hitherto

8   unknown phenomenon of nature." Nature does not have a need to approximate polynomials.

9   Instead, nature works by following the laws of nature, in which the laws of nature are solved and

10   not just approximated.

11

12   In the last full paragraph on page 14 of the Examiner's Answer, the Examiner asserted the

13   following:

14   Furthermore, appellants' claims are so broad as to include both known and unknown uses
15   and thus preempt the field. Any claim that preempts the field is not eligible for patenting. See <u>Ex</u>
16   <u>parte Lundgren</u>, 76 USPQ2d 1385, 1405 (Bd App & Int 2005), 'A claim that covers ("preempts")
17   any and every possible way that the steps can be performed is a disembodied "abstract idea"
18   because it recites no particular implementation of the idea (even if one is disclosed)."
19
20   Although the Examiner has not specifically identified the "field" that Appellants' claimed

21   invention allegedly preempts, Appellant presumes that this "field" is that of "approximating

22   polynomials." If so, the Examiner's factual support for this alleged preemption is woefully

23   lacking. To allege that Appellants' claimed technique will "preempt the field" evidences a lack

24   of understanding as to how many other techniques have been used.[2] One of the earlier methods

25   described for approximate polynomials is "Newton's method" named after Isaac Newton, who

26   described the method, which means that a method of approximating polynomials has a priority

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[2] A discussion on polynomials and as to how approximate solution to polynomial equations can be found at
http://en.wikipedia.org/wiki/Polynomial.

1   date that goes back at least three centuries.[3] Besides, Newton's method, other methods include

2   the Clenshaw algorithm, the Durand-Kerner method, etc. Thus, the Examiner's assertion that

3   Appellants' claimed invention preempts the field is factually unsupported.

4

5   In the paragraph spanning pages 14 and 15 of the Examiner's Answer, the Examiner

6   further asserted the following:

7
8
9
10
11   Appellants' argument concerning the credible utility of improving the precision of a floating-point number system in a computer is noted. It would be conceded that if appellants' claims are found not to be an abstract idea and that the claims do not preempt then they would have a credible utility.

12   As such, the Examiner <u>admits</u> that the claimed invention has a credible utility.

13

14   In the first full paragraph on page 15 of the Examiner's Answer, the Examiner again cited

15   <u>Gottschalk v. Benson</u>. As already argued above, the Examiner's reliance on this case law is

16   misplaced. Appellants are <u>not</u> claiming a scientific truth or the mathematical expression thereof.

17   Also, Appellants are not just claiming an equation, in isolation, with a computer. Instead,

18   Appellants are claiming a particular technique for use in a computer to improve the precision of a

19   computer and a computer having an improved precision using this technique. This is not

20   analogous to the fact pattern of <u>Gottschalk v. Benson</u>.

21

22   <u>In re Comiskey</u>

23   With regard to determining statutory subject matter, the Honorable Board is directed to

24   the recent decision of the Federal Circuit of <u>In re Comiskey</u>.[4] Although the Court held several

25   claims directed to non-statutory subject matter, the Court determined that other of the claims

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[3] http://en.wikipedia.org/wiki/Newton%27s_method.
[4] Appeal No. 2006-1286.

were directed to statutory subject matter. In determining the latter, the Court stated the following:

> These claims, under the broadest reasonable interpretation, <u>could</u> require the use of a computer as part of Comiskey's arbitration system. (emphasis added)

The Court concluded that the claims meet the requirements of 35 U.S.C. § 101 if, under a broadest reasonable interpretation, the claims <u>could</u> require the use of statutory subject matter (e.g., a computer, a device, a product, etc.). The determination of whether or not the claims could require use of a computer need not be made with regard to independent claim 1. Method claim 1 specifically recites a machine-processing method for computing a property which is performed on a machine processing unit. Thus, claim 1 clearly requires that the method is performed using a device. Also, independent claim 23 is directed to a machine. Thus, independent claim 23 clearly requires the use of a machine.

Prior Art Rejections

On pages 11-17 of the Appeal Brief, Appellants engaged in a clause-by-clause deconstruction of claim 1 and the Examiner's rejection thereof. As noted in the first full paragraph on page 12 of the Appeal Brief, the Examiner relied upon Bishop to teach certain basic elements of the claimed invention (i.e., inputting data, computing a property, and outputting data). The Examiner then relied on Kametani to teach the remainder of the limitations recited in claim 1.

The paragraph spanning pages 15 and 16 and the first full paragraph on page 16 of the Examiner's Answer, although addressing certain points made by Appellant, do not appear to be

1   particular germane. Instead, the Examiner's main assertions made in response to Appellants'

2   arguments appear to be found in the second full paragraph on page 16 and in the paragraph

3   spanning pages 16 and 17 of the Examiner's Answer. Similar to the Examiner's response to

4   Appellants' arguments with regard to the Examiner's rejection based upon 35 U.S.C. § 101, the

5   Examiner does not directly address many of Appellants' arguments. Instead, the two paragraphs

6   written by the Examiner is response to Appellants' arguments appear to be directed, respectively,

7   to steps "a) reading ..." and "d) outputting." As such, the Examiner's rebuttal **completely**

8   **ignores** steps "b) building ...," "i) determining ...," "ii) determining ...," and "c) constructing

9   ...," which constitute a substantial portion of the claimed invention.

10

11   Notwithstanding the Examiner not directly addressing many of Appellants' arguments,

12   the Examiner initially asserted the following:

13   Appellants' dispute the Taylor series expansion (e.g., claim 1, lines 4-7) denoted in
14   Kametani to which represent abstract representations of the polynomials set forth in appellants'
15   invention. Specifically, the equations in claims 1 and 23, lines 4-7 and Kametani (column 4, lines
16   52-66) that <u>are similar in their representation of the summation of multiplying two functions, with</u>
17   <u>one function raised to a power</u>. The functions of Kametani are an abstract representation with
18   different coefficients that <u>mirror the functional intent</u> of the invention. The latter rebuttal is echoed
19   for claims 1 and 23, lines 8-21 as anticipated by Kametani (column 4, line 68). (emphasis added)
20

21   Appellants draw attention to the two underlined comments from the above-reproduced

22   passage. In this first comment, the Examiner does not even allege that Kametani identically

23   discloses the claimed limitations. Instead, the Examiner asserts they are "similar" and that the

24   basis for this similarity is "the summation of multiplying two functions, with one function raised

25   to a power." In response, Appellants note that "similarity" is not enough to establish a prima

26   facie case of obviousness. Many inventions are "similar" to what has come before, but this

27   similarity, alone, is not enough to establish obviousness. Also, the Examiner appears to have

1 simplified Appellants' claimed limitations (and thus ignoring many other limitations) by referring

2 to "the summation of multiplying two functions, with one function raised to a power."

3

4   The Examiner's second statement that the functions of Kametani "mirror the functional

5 intent of the invention" is without factual support. The Examiner's analysis is completely silent

6 with regard to specifically identifying the "functions of Kametani" and comparing those

7 functions to that of certain elements of the claimed invention.

8

9   The Examiner's final assertion with regard to claim 1 is the following:

10   Appellants dispute the prior art limitations for claims 1 and 23, lines 22-26 denoting
11 "outputting, via said machine-processing unit, said value of the first polynomial $p(x)$ representing
12 said property of the mathematically modeled physical system, wherein said value of the first
13 polynomial is outputted as a floating point number and the floating point number is a digital
14 representation of an arbitrary real number in said machine processing unit". In this instance, the
15 citations of Kametani in column 2, lines 5-10 and 30-40 denote a series of polynomials. Column
16 5, lines 15-30, lines 11-15 of Kametani denotes $a_0 (X')$ and $a_1 (X')$ as a polynomial series to which
17 anyone can deduce the function of $a_n (X')$ is the first polynomial in the series. It would have been
18 obvious to one of ordinary skill in the art at the time of invention to deduce the floating-point
19 process (Kametani: column 2, lines 45-48), which encompasses various polynomials in order to
20 extract a specific numerical output (Kemetani: abstract, lines 1-3 ". . .floating point operation for
21 calculating an approximate solution"). Furthermore, <u>appellants' arguments, to the merits of the</u>
22 <u>claims relative to the prior art, only reaffirm the preemption argument, as stated above</u>. (emphasis
23 added)
24
25 As noted above, the Examiner continues to ignore Appellants' arguments. The only conclusion

26 made by Appellants with regard to the claimed "outputting ..." step is found on page 17 of the

27 Appeal Brief and is that although the passage cited by the Examiner "describes the use of a

28 'floating point operation unit,' this passage is silent as to the value of the first polynomial being

29 outputted as a floating point number. The Examiner's analysis, however, completely ignores this

30 argument and proceeds on a tangent having an unknown relevance to the issues at hand.

31

1   Moreover, Appellants' note that the Examiner's final argument that "appellants'
2   arguments, to the merits of the claims relative to the prior art, only reaffirm the preemption
3   argument, as stated above" turns, on end, Appellants' prior arguments. For example, on page 11
4   of the Appeal Brief, Appellants noted that claim 8 of Kametani was directed to "[a] method for
5   floating point operation for calculation an approximate solution …" Thus, Appellants explicitly
6   recognized that other methods exist for approximating polynomials, which is evidence against
7   the Examiner's preemption argument.
8

For the reasons set forth in the Appeal Brief of February 16, 2007, and for those set forth herein, Appellants respectfully solicit the Honorable Board to reverse the Examiner's rejections under 35 U.S.C. §§ 101, 103.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 09-0461, and please credit any excess fees to such deposit account.

Date: October 1, 2007   Respectfully submitted,

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